Serial Number: 09/854,539 Filing Date: May 14, 2001

Title: POLYMERIC ENCAPSULATION MATERIAL WITH FIBROUS FILLER FOR USE IN MICROELECTRONIC CIRCUIT

PACKAGING

Assignee: Intel Corporation

IN THE CLAIMS

The pending claims are reproduced herein for the Examiner's convenience.

- 1. (Original) A microelectronic device comprising:
 - a package core having an opening therein;
 - a microelectronic die located within the opening of said package core; and
- a fiber reinforced encapsulation material within the opening of said package core to hold said microelectronic die within said package core, said fiber reinforced encapsulation material including a polymeric resin having a fibrous filler material.
- 2. (Original) The microelectronic device of claim 1, wherein: said fibrous filler material includes individual fibers having a length between 1 micrometer and 40 micrometers.
- 3. (Original) The microelectronic device of claim 1, wherein: said fibrous filler material includes individual fibers having a length to width ratio that is no less than 5.
- 4. (Withdrawn) The microelectronic device of claim 1, wherein: said fibrous filler material includes glass fibers.
- 5. (Original) The microelectronic device of claim 1, wherein: said fibrous filler material includes carbon fibers.
- 6. (Withdrawn) The microelectronic device of claim 1, wherein: said fibrous filler material includes Kevlar® fibers.

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7. (Withdrawn) The microelectronic device of claim 1, wherein: said fibrous filler material includes ceramic fibers.

- 8. (Withdrawn) The microelectronic device of claim 1, wherein: said fibrous filler material includes metal fibers.
- 9. (Original) The microelectronic device of claim 1, wherein: said polymeric resin includes epoxy.
- 10. (Original) The microelectronic device of claim 1, wherein: said polymeric resin includes plastic.
- 11. (Original) The microelectronic device of claim 1, comprising: at least one metallization layer built up over said package core, said at least one metallization layer being conductively coupled to bond pads on a surface of said microelectronic die.
- 12. (Withdrawn) A microelectronic device comprising: a package substrate;
- a microelectronic die mechanically coupled to said package substrate, said microelectronic die having a plurality of electrical contacts that are conductively coupled to contacts on said package substrate; and
- a fiber reinforced encapsulation material mechanically coupled to said microelectronic die to provide structural support for said microelectronic die, said fiber reinforced encapsulation material including a polymeric resin having a fibrous filler material.
- 13. (Withdrawn) The microelectronic device of claim 12, wherein: said fiber reinforced encapsulation material forms a fillet between said microelectronic die and said package substrate.

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(Withdrawn) The microelectronic device of claim 12, wherein: 14. said fiber reinforced encapsulation material forms a globule covering said microelectronic die.

- 15. (Withdrawn) The microelectronic device of claim 12, wherein: said package substrate includes a flexible circuit board.
- (Withdrawn) The microelectronic device of claim 15, wherein: 16. said fiber reinforced encapsulation material fills a region between said microelectronic die and said flexible circuit board.
- 17. (Withdrawn) The microelectronic device of claim 12, wherein: said fibrous filler material includes individual fibers having a length between 1 micrometer and 40 micrometers and a length to width ratio that is no less than 5.

Claims 18-24 (Canceled)

- 25. (Withdrawn) A microelectronic device comprising: a flexible circuit board including a first side and a second side; a microelectronic die attached to the first side; a compliant buffer on the first side of the flexible circuit board, wherein the compliant buffer is between the die and the flexible circuit board; and a fiber reinforced encapsulation material to hold the microelectronic die to the flexible circuit board.
- 26. (Withdrawn) The microelectronic device according to claim 25, further including: an opening in the flexible circuit board; a bond pad on the microelectronic die; and a bond ribbon that extends from the bond pad, through the opening, to the second side.

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27. (Withdrawn) The microelectronic device according to claim 25, further including: an opening in the flexible circuit board;

- a bond pad on the microelectronic die;
- a bond ribbon that extends from the bond pad, through the opening, to the second side; and
- a contact structure attached on the second side.

a solder ball contact structure attached on the second side.

- 28. (Withdrawn) The microelectronic device according to claim 25, further including: an opening in the flexible circuit board; a bond pad on the microelectronic die; a bond ribbon that extends from the bond pad, through the opening, to the second side; and
- 29. (Withdrawn) The microelectronic device according to claim 25, wherein the fiber reinforced encapsulation material includes a fiber selected from glass, carbon, Kevlar®, ceramic, and metal.
- 30. (Withdrawn) The microelectronic device according to claim 25, wherein the fiber reinforced encapsulation material includes a fiber selected from glass, carbon, Kevlar®, ceramic, and metal, and wherein the fiber has a length between 5 and 40 micrometers and a diameter between 0.5 and 5 micrometers.
- 31. (Withdrawn) The microelectronic device according to claim 25, wherein the fiber reinforced encapsulation material includes a polymeric resin selected from epoxy and plastic.